

FRANTSEVICH, I.N.

PHASE I BOOK EXPLOITATION

253

Yeremenko, V.N.

Karbid titana i zharostoykiye materialy na yego osnove (Titanium Carbide and Other Heat Resistant Materials with a TiC Base)
Kiyev, Izd-vo AN Ukr. SSR, 1954. 74 p. 3,000 copies printed.

Sponsoring agency: Akademiya nauk Ukrainskoy SSR. Laboratoriya spetsial'nykh splavov.

Resp. Ed.: Frantsevich, I.N., Corresponding Member AN Ukr. SSR; Ed. of Publishing House: Shtul'man, I.F.; Tech. Ed.: Sivachenko, Ye.K.

PURPOSE: This book is intended for researchers, metallurgists, designers, instructors, students, and others who are interested in the use of cermets, particularly titanium carbide, in jet-aircraft engines. The interest has arisen as a result of the need for constructional materials which will withstand operating temperatures above 1000°C.

Card 1/5

Titanium Carbide and Other Heat Resistant Materials (Cont.) 253
COVERAGE: The author discusses the properties of titanium carbide and other heat-stable materials with a TiC base and briefly describes methods of preparing them. All previous investigations of these materials are surveyed. The author states that the presently-used materials (nickel, cobalt, iron, and chrome alloys, containing various amounts of Mo, Ti, Ta, Nb, W, Al, etc.) are unsatisfactory for use at temperatures above 1000°C. He states that titanium carbide, because of its low specific gravity, resistance to thermal shock and oxidation, and ability to combine with metals, appears to present the best prospects for combining the desirable properties of metals and ceramic materials. There are 133 references, of which 23 are Soviet, 76 English, 31 German, 2 French, and 1 Austrian.

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FRANTSEVICH, I. N.

AID - P-93

Subject : USSR/Chemistry

Card : 1/1

Authors : Frantsevich-Zabludovskaya, T. F., Frantsevich, I. N., and Modylevskaya, K. D.

Title : Manufacture of ternary Ni-Fe-Mo alloys by electrolysis

Periodical : Zhur. Prikl. Khim. 27, no. 4, 413-420, 1954

Abstract : A method for rapid analysis of the electrolyte developed by the authors is described. Alloys of a given composition can be obtained by maintaining the composition of the electrolyte unchanged and the distribution of the current on the cathode uniform. Thirteen references (three U.S.S.R.): 1931-1952. Two photos; 2 graphs; 1 table.

Institution : None

Submitted : October 18, 1952

FRANTSSEVICH, Ivan Nikitich; CHERNOVOL, Vasilii Semenovich; CHERNOT, Iosif Samoylovich; PILIPENKO, Nina Alekseyevna; YAGUPOL'SKAYA, Lidiya Naumovna; ZIL'BAN, M.S., redaktor; FEDORCHENKO, I.M., doktor tekhnicheskikh nauk, redaktor; RAKHLINA, N.P., tekhnicheskiiy redaktor

[Over-all electric controlling of corrosion in the Dashava - Kiev gas pipe line] Kompleksnaia elektrozashchita gazoprovoda Dashava - Kiev ot korrozii. Kiev, Izd-vo Akademii nauk USSR, 1955. 30 p. (MIRA 9:3)
(Corrosion and anticorrosives) (Gas, Natural--Pipelines)

FRANTSEVICH, I. N.

Aluminum-calcium (corrosion) protectors. I. N. Frantsevich and Z. P. Fedorova. Doklady Akad. Nauk SSSR, 1974

R.S.R. 1975, No. 1, 83 G (Russian summary).—Alloys of Al + 2-10% Ca, prepd. electrolytically (with a liquid Al cathode) and thermally, were coupled with Fe and the elec. potentials η in sea and tap H_2O were detd. The best protection was obtained with an alloy contg. 7.55% Ca (the eutectic of the system) and lasted until it was practically all used up: η = -1.16 v. which, after 160 days, increased to -0.88 v. in sea water and -0.83 v. after 772 days in tap water. The min. protective η , previously detd., is -0.85 v. (cf. C.A. 45, 1942b). The protective virtue of Ca is ascribed to its ability to peptize the products of corrosion, thus acting as a depolarizer. —J. Bancowitz

off ①
MKT

USSR/Magnetism - Ferromagnetism

F-4

Abs Jour : Referat Zhur - Fizika, No 5, 1957, 12001

Author : Gunchenko, A.I., Frantsevich - Zabludovskaya, T.F.,
Frantsenich, I.N., Chekhova, O.A.

Inst :
Title : Magnetically-soft Metal-Ceramic Materials.

Orig Pub : Poroshkovaya metallurgiya, Yaroslavl', 1956, 279-294

Abstract : Description of the technology of obtaining powdered electrolytic alloys of the molybdenum-permalloy type and of the supermalloy type. Alloys of permalloy were prepared by electrolysis of solutions containing nickel, iron, molybdenum, manganese, and copper in varying concentrations. The materials obtained in this manner were ground into a fine powder in several fractions from 100 to 270 mesh, from which the rods were made by pressing and sintering. Magnets of commercial powder of electrolytic iron, subjected to annealing, were made simultaneously.

Card 1/2

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 10, p 81 (USSR)

AUTHORS: Frantsevich, I.N., Fedorchenko, I.M., Radomysel'skiy, I.D.,
Barabash, M.L., OI'shanskiy, M.A., Nichiporenko, O.S.

TITLE: Wear-resistant Iron Powder Contact Inserts for Trolleybuses
(Iznosostoykiye metallokeramicheskiye zheleznyye tokopri-
yemnyye vstavki dlya trolleybusov)

PERIODICAL: V sb.: Povysheniye iznosostoykosti i sroka sluzhby mashin.
Kiyev - Moscow, Mashgiz, 1956, pp 304-312

ABSTRACT: A description is presented of iron-and-graphite cermet contact inserts (ICI) for trolleybuses. The ICI are made from a mixture of Fe and graphite (G) powders compacted cold and then sintered in a shielding or inert atmosphere. The G acts as lubricant between the rubbing surfaces of the ICI and the contact wire. The ICI operate at current densities of up to 60 amps/cm², 500 v potential, and a pressure of 2-3 kg/cm². It is pointed out that ICI undergoes less wear than does a copper-and-graphite substance, but that the trolley contact wires are exposed to greater wear. It is found that the G content has a pronounced effect on the wear resistance of the ICI.

Card 1/2

SOV/137-57-10-19006

Wear-resistant Iron Powder Contact Inserts for Trolleybuses

Minimum wear is shown by ICI when the cermet contains 8% G. There is a sharp drop in ultimate strength (by more than half) as G content rises from 2 to 8%. After sintering at 870°C the structure of the material consists of ferrite and G. Sintering at 950° causes a harder pearlite to form. As a result of the investigation, a material was adopted consisting of Fe powder derived from reduction of scale as a base, with the addition of 5.6 and 8% G. 2% Cu is added to some compositions. Sintering is run for 4 hours at 920 and 950°. The porosity of the ICI is 9-15%. The work of the Kiev trolleybus system showed the use of ICI to be entirely satisfactory. The life of ICI is 2.36 times as great as that of copper-and-graphite inserts, and its cost is 63 percent lower. The Kiev Street Railway Plant im. F. E. Dzerzhinskiy has developed the process of manufacturing ICI, with sintering in boxes.

S.Ts.

Card 2/2

Present-Day Problems of Power Metallurgy

Abstract. A method of producing hard alloys in the Ukraine is described. The hard alloys are made by natural gas, in the form of acetylene, and a further 1 million tons of natural gas in the industry. The powder produced contains 10% of Si, 0.2% S, 0.02% P, and 0.005% Cu. The possibility of obtaining plates of pure Ag and Au could carry 20,000 or 30,000 amp of current at 100°C thermal and elect. conductivity, and a high degree of corrosion resistance. Addn. of Fe to the cutting alloy has raised the working temp. by 200°C, thus increasing the cutting speed. Appln. of vacuum techniques in the hardening of hard metals from D.P.N. 94 to 100°C has increased the strength of stable metal alloys (e.g., Al, Cu, Fe, etc.) in this e.g. Cr, giving even higher working temp. and faster cutting the cutting speed. Various relations, dependent on a number of between kinetic factors and phys. parameters of sintering (e.g. temp., internal stress, but no math. deriv. of theory) was found to give clear quant. laws governing the sintering process. Progress is blocked mainly by insufficient experimental data. (S. E. H.)

ANTSEVICH, I N

The Elastic Constants of Metals and Alloys, I. N. Antsevich, *Problems of Powder Metallurgy*, Vol. 1, No. 1, 1964, p. 1-12.

Russian]. F reviews work on determining the relation of elastic const. with other phys. parameters. A table shows disagreement in the results of different workers. Values should be extrapolated to zero load. Conditions of manufacture (work-hardening, plastic deformation) are known to affect the elastic const. Compressibility changes with pressure. Cs at 45,000 kg./cm.² undergoes a vol. change of 5.0%. This is explained by quantum mechanics which shows that at 50,000 kg./cm.² a shift occurs of Cs electrons to the 5d shell. A study was made of alloying elements which could stabilize or weaken the lattice, and the idea of the dependence of phys. properties on the strength of the interat. bonds is considered. Strength can be determined in many ways, including a calculation of the mean sq. displacement of atoms in the lattice, \bar{u}^2 . The equation for this is in terms of the Debye temp., θ . The modulus of elasticity could also be found in terms of θ , and hence in terms of \bar{u}^2 . Accuracy is within 3-5%. Experiments showed the strengthening role of Cr in Fe-Cr, donating its electrons to build up the d shell in Fe. It is shown that Pd exists as neutral atoms in Fe. Room temp. values of \bar{u}^2 for various metals should be presented to estimate their comparative advantages as materials.

B m

FRANTSEVICH I. N.
USSR/Electricity - Conductors

G-4

Abs Jour : Referat Zhur - Fizika, No 5, 1957, 122⁴⁴
Author : Frantsevich, I.N., Kalinovich, D.F.
Inst :
Title : Phenomenon of Electro-Transfer in Solid Metallic Solutions.
Report I.
Orig Pub : Vopr. poroshkovoy metallurgii i prochnosti materialov.
Vyp. 3, Kiev., AN USSR, 1956, 45-61
Abstract : An experimental study, with the aid of radioactive C^{14} ,
was made of the transfer of carbon in austenite under the
influence of a direct electric current in the temperature
range from 950 to 1150°. To separate the effect of elec-
trolysis and thermal diffusion, the Guterman procedure was
used, (Guterman, V., Izv. Sektora fiz. khim. analiza
IONKH AN SSSR, 1949, 10 -- 11). Wire specimens of Armco
iron (diameter 0.58 mm, length 60 mm) were coated with cop-
per, with the exception of a 20 mm center section, which

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USSR/Electricity - Conductors

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Abs Jour : Ref Zhur - Fizika, No 5, 1957, 12244

was subjected to carbonization (dementation); BaCO_3 containing C^{14} was introduced into the carburizer.

For the measurements, the copper layer was removed, the specimens were placed in heating ampoules of molybdenum glass, filled with pure argon (pressure of 300 mm mercury). The ends of the specimens were welded to molybdenum conductors, fused into the ampoules. The electrolysis was carried out at a voltage of 1.5 -- 3.5 volts and a current from 5 to 8 amp. The thermal diffusion was investigated by heating the specimens to a suitable temperature with alternating current and holding them for the same length of time as in electrolysis.

During the electrolysis process, the front of the carbon shifts toward the cathode; the activity of the anode portion of the cemented portion falls to zero.

In the quantitative processing of the experimental data, account was taken of the thermal diffusion. the frontal

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USSR/Electricity - Conductors

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Abs Jour : Ref Zhur - Fizika, No 5, 1957, 12244

displacement of the carbon upon electrolysis is considered by the authors to be evidence of total ionization of the carbon atoms in the Fe-C system. During the electrolysis there arises a gradient of concentration of carbon, which can be explained by assuming that the transport takes place with participation of the iron ions from the carburized zone, which receive electrons for the completion of the d-subgroups from the carbon atoms, and which turn into ions, whose charge polarity is opposite to that of the carbon ions. For the shifts of the carburized zone during the time t , the following formula was obtained: $s = 6N_cDt \sinh(zFJ/\chi qRT)$, where N_c is the concentration of the ions of carbon in the considered cross section, D the diffusion coefficient of carbon in δ -iron, F the Faraday number, J the strength of the current during the electrolysis, and χ the specific electric conductivity. The linear dependence of s on t is experimentally verified.

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Card 4/4

Frantsevich, I.N.

112-2-3585

Translation from: Referativnyy Zhurnal, Elektrotehnika, 1957,
Nr 2, p. 155 (USSR)

AUTHOR: Frantsevich, I.N., Pilipenko, N.A., Lyashenko, M.Ye.

TITLE: The Effect of the Cathode Polarization of Electrically
Protected Steel Gas Mains on Asphalt Insulating Coating
(O vliyanii katodnoy polarizatsii stal'nykh gazoprovodov
v usloviyakh elektrozashchity na sostoyaniye izo-
lyatsionnogo bitumnogo pokrytiya)

PERIODICAL: In Sbornik: Vopr. poroshkovoy metallurgii i prochnosti
materialov. Nr 3, Kiyev, AN UK.SSR, 1956, pp.122-136

ABSTRACT: The dependence of the asphalt pipe coating
on the thickness of the coating, the existence of
initial erosion and the magnitude of the potential
on the electrodes was studied on spherical electrodes
under constant and high humidity conditions. Most of the
experiments lasted more than a year and a half. It was
found, that the ductility of the coating dropped from
3 to 0, the penetration from 18 to 2.5 to 2, and the
softening temperature rose from 80 to 90° to 112 to 124°. In the vicinity of the coating the pH acidity of the soil
dropped from 8.5 to 7.4 which, supposedly, can be ex-

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112-2-3585

The Effect of the Cathode Polarization of Electrically (Cont.)

plained by the interaction of the coating with the acid soil or by the saponification of esters present in the asphalt. At low electrode potential (in the order of 2 v) the undamaged insulating coating completely peels off after several weeks. The two initial insulation faults, measuring 4 to 16mm² in area sharply speed up the peeling process of the coating. At an electrode potential of 1 v, the effect of polarization on the condition of the coating is very slight indeed. When the thickness of the insulation is increased, the peeling process slows down. Decreased circuit resistance and higher current is the sign of peeling. When the peeling is complete, the current drops. Hydrogen depolarization is the principal cause of flaking. Tests have confirmed the hypothesis, that it is

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112-2-3585
The Effect of the Cathode Polarization of Electrically (Cont.)

necessary to increase the potential on the pipe lines and to compensate for the contracted zone of protection by setting up intermediate cathode stations or projectors as the properties of the coating deteriorate. Data gathered from inspection of the Dashava-Kiev gas main are given. In 1949 no evidence of aging or deterioration was uncovered. Of 100 places inspected in 1952, 38 proved to have defective insulation (17 due to plant roots). Low temperature caused the rest of the damage. In 1954, of 24 places inspected in the course of maintenance work only 17 per cent showed no insulation-coating deterioration. Cases of natural coating-aging were discovered. There was no noticeable change in the physical and mechanical properties of the basic mass of the coating.

D.S.K.

Card 3/3

SOV/137-57-11-20742

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 11, p 17 (USSR)

AUTHORS: Frantsevich, I.M. [Frantsevych, I.M.]

TITLE: Some Data on the History of the Development of Powder
Metallurgy in the Ukraine (Nekotoryye dannyye po istorii
razvitiya poroshkovoy metallurgii na Ukraine) in Ukrainian

PERIODICAL: Narysy z istoriyi tekhn. AN URSR, 1956, Nr 3, pp 40-45

ABSTRACT: Bibliographic entry

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SOV/137-57-11-21234

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 11, p 87 (USSR)

AUTHORS: ~~Frantsevich, I.M.~~^{N.} Podorvan, I.M., Rudchenko, Yu.V.

TITLE: Electrochemical Production of Al-Ca Alloys With Molten Cathode (Elektrokhimicheskoye polucheniye splavov Al-Ca na zhidkom katode) in Ukrainian

PERIODICAL: Nauk. zap. Kyyivs'k. un-t, 1956, Vol 13, Nr 13, pp 107-118

ABSTRACT: It is shown that Al-Ca alloys may be produced with a molten Al cathode by electrolysis of a eutectic mixture of CaCl_2 and NaCl at temperatures above the eutectic temperature of the Al-Ca system (616°C). The dependence of current efficiency upon temperature, current density, and alloy composition is established. The optimum current efficiency was observed at $780-800^\circ$ and a current density of $0.6-0.7 \text{ amp/cm}^2$. Under these conditions of electrolysis it is not possible to obtain an alloy with Ca contents $> 25\%$.

Card 1/1

N.P.

FRANTSEVICH, I. N. (Kiev)

"Thermal Stability of Powder-Metallurgical Materials."

report presented at the 1st Int'l. Powder Metallurgy Meeting in Eisenach,
28-31 May 1957.

Neue Huette, Dec 1958.

FRANTSEVICH, I.N.

"An Investigation of Electric Transport in Solid Solutions of Metals using Radiocative Isotopes," I.N. Frantseovich, Ukrainian SSR, Kiev, USSR

Paper presented for Presentation at the International Conference on Radioisotopes in Scientific Research, Paris, 9-20 Sep 1957.

Inst. for Metalloceramics, Acad. Sci. Ukr SSR, Kiev,

GRUZIN, P. L., FRANTSEVICH, I. N., ZHUKHOVITSKIY, A. A., BORISOV, V. P.
AND BOKSHTAIN, S. Z.

"Concerning the Diffusion and Electric Transmission of Carbon in Iron and its Alloys"

report presented at the UNESCO Conference on the Utilization of Radioactive Isotopes in Scientific Research, Paris, 9-20 Sept 1957.
Vestnik AN SSSR, 1958, v. 28, No. 1, pp. 71-78. (author Vinogradov, A. P.)

MEL'NICHUK, Petr Ivanovich; FRANTSEVICH, I.N., otv.red.; PECHKOVSKAYA,
O.M., red.izd-va; MATVEYCHUK, A.A., tekhn.red.

[Studying the modulus of elasticity and hardness of aging copper-
base alloys] Issledovanie modulia uprugosti i tverdosti stareiu-
shchikh splavov na mednoi osnove. Kiev, Izd-vo Akad.nauk USSR,
1957. 42 p. (MIRA 12:3)

1. Chlen-korrespondent AN USSR (for Frantsevich).
(Copper alloys--Testing)

ZHURAKHOVSKIY, Aleksandr Feofanovich; FRANTSEVICH, I.N., otv.red.;
PECHKOVSKAYA, O.M., red.izd-va; RAKHLINA, D.P., tekhn.red.

[Calcium-containing anode alloys; preparing alloys and testing
their protective properties] Protektornye splavy, soderzhashchie
kal'tsi; poluchenie splavov i issledovanie zashchitnykh svoistv.
Kiev, Izd-vo Akad.nauk USSR, 1957. 49 p. (MIRA 12:3)

1. Chlen-korrespondent AN USSR (for Frantsevich).
(Alloys--Testing) (Corrosion and anticorrosives)

SOV/137-58-8-18061

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 8, p 265 (USSR)

AUTHORS: Frantsevich, I. N., Kalinovich, D. F.

TITLE: Investigation of Electric Transfer in Solid Metallic Solutions
(Issledovaniye elektroperenosa v tverdykh metallicheskih
rastvorakh)

PERIODICAL: V sb.: Issled. po zharoprochn. splavam. Vol 2. Moscow,
AN SSSR, 1957, pp 329-358

ABSTRACT: Ref. RZhMet, 1956, Nr 10, abstract 10898

1. Metals—Electron transfer

Card 1/1

FRANTSEVICH, I. N.

21-6-10/22

AUTHORS:

Frantsevich, I.N. (I.M.), Member of the AN Ukrainian SSR,
Zhurakhovskiy, A.F. (Zhurakhovs'kyi, O.F.), Pechentkovskiy
(Pechentkovs'kyi), Ye. L.

TITLE:

Aluminum-Calcium and Zinc-Calcium Protectors (Alyumokal'-
tsiyevyye i tsinkokal'tsiyevyye protektory)

PERIODICAL:

Dopovidi Akademii Nauk Ukrain's'koi RSR, 1957, No 6, pp 575-
579 (USSR)

ABSTRACT:

Protective alloys containing magnesium and aluminum-calcium compounds were subjected to tests under working conditions. The underwater part of the tanker "Drogobych" cruising the Black Sea, which was provided with zinc protectors during the ship construction, was examined. The results of the tests have shown the complete failure of zinc protectors due to their deactivation. Magnesium and aluminum-zinc-calcium protectors were functioning satisfactorily during the whole period of tests and ensured complete protection of the structures from corrosion in sea water. Magnesium protectors of adopted size were fully destroyed after 25 to 30 days, while the aluminum-zinc-calcium protectors were worn by only 8 to 10% after 43 to

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Aluminum-Calcium and Zinc-Calcium Protectors

21-6-10/22

47 days of functioning. Aluminum-zinc-calcium protectors with the intrinsic effect of depassivation (restoration of activation) can be recommended for the use to protect from the sea corrosion as the most effective and durable and the least expensive. The article contains 3 figures, 2 tables and 2 Slavic references.

ASSOCIATION: Institute of Metalloceramics and Special Alloys of the AN Ukrainian SSR (Instytut metalokeramiky ta spetsial'nykh splaviv AN URSR)

SUBMITTED: 13 March 1957

AVAILABLE: Library of Congress

Card 2/2

FRANTSEVICH, I.N.
FRANTSEVICH, I.N.

Heat-resistant materials in present-day technology. Visnyk AN
URSR 28 no.10:37-44 0 '57. (MIRA 10:12)
(Heat-resistant alloys)

BELYAKOVA, Yevgeniya Pavlovna [Bieliakova, I.E.P.]; FRANTSEVICH, Ivan
Nikitovich [Frantsevych, I.M.]; DOBROKHOTOV, M.M., akademik,
otv.red.; REMENNIK, T.K., red.izd-va; LABINOVA, N.M.,
red.izd-va; SKLIYAROVA, V.Ye., tekhn.red.

Maksym Vlasovych Luhovtsov. Kyiv, Vyd-vo Akad.nauk URSR,
1958. 35 p. (MIRA 15:4)

1. AN USSR (for DobrokhotoV).
(Luhovtsov, Maksym Vlasovych, 1885-1956)

SOV/1270

PHASE I BOOK EXPLOITATION

25(1)

Frantsevich, Ivan Nikitich, Corresponding Member, Ukrainian Academy of Sciences

Poroshkovaya metallurgiya (Powder Metallurgy) Moscow, Izd-vo "Znaniye," 1958.
70 p. (Series: Vsesoyuznoye obshchestvo po rasprostraneniyu politicheskikh
i nauchnykh znaniy. Seriya IV, 1958, no. 34/35) 46,000 copies printed.

Sponsoring Agency: Vsesoyuznoye obshchestvo po rasprostraneniyu politicheskikh
i nauchnykh znaniy.

Ed.: Islankina, T.F.; Tech. Ed.: Berlov, A.P.

PURPOSE: This booklet is intended for readers interested in various branches of
modern technology.

COVERAGE: The author gives a brief history of the development of powder metallurgy
and discusses its applications in various branches of the Soviet national
economy. The aim of the booklet is to point out the advantages of powder
metallurgy, the excellent quality of products made by the process, and the
multiplicity of such products. No personalities are mentioned. There is no
bibliography.

Card 1/2

3-12-59

FRANTSEVICH, I. N.

18(0.7) PAGES 1 BOOK EXPLOITATION 309/2170

Andriyevskiy nauk Ukrainy SSR. Institut metallofiziki i special'nykh splavov

Voprosy porokhovykh metallurgicheskikh i prochnostnykh materialov, vyp. 5 (Problems in Powder Metallurgy and Strength of Materials, No. 5) Kiev, Izd-vo AN USSR, 1958. 172p. 2,000 copies printed.

Ed. of Publishing House: Ya. A. Samoylov; Tech. Ed.: V. Ye. Sklyarova; Editorial Board: I. N. Frantsevich (Resp. Ed.), I. M. Fedorchuk, O. S. Piterenko, O. V. Samonov, and V. V. Orlovskiy.

PURPOSE: This collection of articles is intended for a wide circle of scientists and engineers in the research and production of powder metallurgy. It may also be useful to advanced students of metallurgical institutes.

CONTENTS: This collection of articles describes the results of investigations made at the Institute of Powder Metallurgy and Special Alloys, Academy of Sciences, Ukrainian SSR. The physical and chemical properties of materials used in powder metallurgy are discussed. Materials described as new, production processes, methods and results of mechanical testing are described. No personalities are mentioned. References follow each article.

TABLE OF CONTENTS:

Frantsevich, I. N., and T. S. Vashchenko. The Problem of Radio-Graphical Investigation of the Characteristic Temperature in respect to the Strength of Metal and Alloys and the Effect of the Alloying Elements on High-Temperature Strength Properties. 49

Andriyevskiy, R. A. The State of Certain Problems of the Theory of Sintering of Powdered Metals. The author discusses the theory of sintering, the role of surface phenomena during sintering, diffusion and plastic flow and recrystallization during sintering in an attempt to clarify the physical nature of sintering. 54

Zorchenko, V. N., and Ya. V. Matson. The Role of the Transfer of the Substance Investigated in the Gas Phase in Sintering Iron and Chromium. The authors investigated the effect of HCl present in the sintering atmosphere on the shrinkage of a specimen, comparing it with sintering during vacuum sintering. 60

Orlovskiy, V. V., V. N. Piterenko, and T. Ya. Kozlovskaya. Chromium Carbide as a Base for Powdered-Metal Materials with Special Properties. The authors discuss methods of preparing various alloys based on chromium carbide, their properties, and applications. 80

Orlovskiy, A. K., I. N. Frantsevich, Z. A. Kuznetsova, I. N. Frantsevich, and O. A. Chukhova. Magnetically Soft Powdered-Metal Materials. Results of investigations dealing with the development of methods for preparing various types of powdered-metal magnetic conductors from magnetically soft metals (electrolytic iron and permalloy-type materials) are presented. 90

Fedorchenko, I. M. Iron Powders and Their Fields of Application. The author cites numerous cases where iron powder can be applied. He stresses the economical factor in the use of iron-graphite powder as high-quality bearing material. 104

Orlovskiy, V. V., and S. S. Tichuk. Pulverizing Titanium Carbide in Gasoline and Alcohol using a Ball Mill with Balls of the same (TiC) composition. 117

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16

FRANTSEVICH, I.N.

AUTHORS: Grigorenko, Ya. M. and Isakhanov, G.V. 24-2-27/28

TITLE: Scientific Conference on the strength of elements of turbo-machinery at elevated temperatures. (Nauchnoye soveshchaniye po voprosam prochnosti elementov turbomashin pri vysokikh temperaturakh).

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1958, No.2, pp. 165-167 (USSR).

ABSTRACT: A scientific conference was held in Kiev between September 28 and October 2, 1957 on problems of strength of elements of turbo-machinery at elevated temperatures which was convened by the Institute of Metallo-Ceramics and Special Alloys (Institut Metallokeramiki i Spetssplovov), the Institute of Structural Mechanics (Institut Stroitel'noy Mekhaniki) and the Institute of Thermal Power (Institut Teploenergetiki Akademii Nauk Ukrainskoy SSR) of the Ac.Sc., Ukrainian SSSR. About 200 people participated representing scientific and teaching establishments and works of Moscow, Leningrad, Kiev, Kharkov, Minsk, Kuybyshev, etc. In his opening address, Corresponding Member of the Ac.Sc. Ukraine I. N. Frantsevich pointed out the importance of the problem of high temperature strength of components of turbo-machinery.

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A number of papers were read relating to the theory of heat conductivity and thermo-elasticity. In his paper "Investigation of the temperature fields in turbine rotors" Ye. P. Dyben reported on the theoretical and experimental investigations of the steady state and the non-steady state thermo-conductivity in turbine rotors of various designs including investigations on concrete specimens of rotors produced by the Kirov and Neva Works, the "Ekonomayzer" Works and others, carried out at the Institute of Thermal Power, Ukrainian Ac.Sc. In studying the temperature fields they used the method of laboratory investigation of non-steady state thermal conductivity by means of high frequency heating, the method of electro-thermal analogy by means of "ЭТА А" equipment etc. They obtained a solution of the problem of non-steady state thermal conductivity of a hollow cylinder of finite length with a relatively general law of the changes of the temperature and the heat transfer coefficients. The Institute, jointly with the Experimental Gas Turbine Construction Works, developed a method of

Card 2/9 cooling the discs by blowing cooling air through the

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Scientific Conference on the strength of elements of turbo-machinery at elevated temperatures.

assembly gaps of the tails of the rotating blades. In his paper "Investigation of the Thermal Stresses in Turbine Rotors" A. D. Kovalenko described results of investigations in the field of thermo-elasticity carried out by the Institute of Structural Mechanics, Ukrainian Ac.Sc., the Kiev State University, the Kiev Polytechnical Institute and the Institute of Thermal Power, Ukrainian Ac.Sc. In these studies the following were investigated: problem of the plane stress state of a disc of variable thickness in the case of a cyclically symmetrical temperature field, problem of complex bending of a disc in the case of an axis-symmetrical temperature field and a variable modulus of elasticity, an axis-symmetrical problem of thermo-elasticity for a thick walled cylinder for various laws of changes of the temperature and of the modulus of elasticity along the radius and along the generatrix, etc. In the investigations strain gauges were used and also electric modelling and computing mechanisms. Furthermore, a method was developed of calculating a rotor of a two-stage aviation gas turbine considering it as a non-uniformly heated and rotating

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Scientific conference on the strength of elements of turbo-machinery at elevated temperatures.

system in which the following elements operate jointly: discs, shells and ring-shaped rods.

In his paper "Certain Methods of Solving the Axis-Symmetrical Problem of the Theory of Elasticity Taking Into Consideration Mass Forces and the Temperature"

E. S. Umanskiy elucidated an approximate method of calculation of the stress state.

The paper of V. I. Danilovskiy (Mechanics Institute, Ac.Sc. USSR) was devoted to calculating the temperature fields in thin shells.

The paper of A. I. Veynik (Power Institute, Ac.Sc. Byelo-Russia) was devoted to an approximate method of solving the problem of thermo-conductivity in solid bodies.

The paper "Temperature Stresses in Thin Walled Structures"

by I. A. Birger and B. F. Shor dealt with the investigations carried out by TsIAM on the thermal stresses in rods, taking into consideration variable elasticity parameters and also with the stress state of thin walled naturally twisted rods which are subjected to the effect of external forces and non-uniform heating.

In the paper "Temperature Stresses in Elements of Gas

Card 4/9 Turbines Under Conditions of Non-steady State Thermal

24-2-27/28

Scientific conference on the strength of elements of turbo-machinery at elevated temperatures.

Regimes" A. G. Kostyuk (MEI) considered the method of approximate solution of the problem of the non-steady state temperature field in which the component is considered as a semi-infinite body during the initial instant of heating.

In his paper "Temperature Stresses in the Runner Blades and Discs" N. N. Malinin (MVTU) described engineering methods of calculating the thermal stresses in discs with variable elasticity parameters.

The papers of Ya. S. Podstrigach (Institute of Mechanical Engineering and Automation, Ukrainian Ac.Sc., L'vov) and of L. G. Fridman (Kuybyshev) dealt with investigations of the temperature stresses in thin walled structures particularly in bodies of aviation engines.

P. S. Kuratov (TsKTI) and Ye. M. Molchanov (VTI) reported on complex investigations of the temperature fields, the stress state and the thermal fatigue of the rotors of definite turbines.

In his paper "Experimental Investigation of the Temperature Stresses in Fully Forged Rotors" G. A. Rayer reported on

Card 5/9 experimental investigations carried out at the Neva

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Scientific Conference on the strength of elements of turbo-machinery at elevated temperatures.

Engineering Works imeni Lenin (Leningrad).
The representative of the Leningrad Metal Works,
Engineer I. N. Shibalov conveyed information on the tests
of equipment for heating individual elements of the
BT-25-4 turbine during starting.

The second part of the conference was devoted to
problems of the constructional strength of elements
on turbo-machinery at elevated temperatures.
In his paper "Work of the Institute of Metalloceramics
and Special Alloys, Ukrainian Ac.Sc. in the Field of
High Temperature Strength" G. S. Pisarenko described
certain results obtained by the team of the Strength
Division of the Institute as regards the development of
new methods and test equipment for studying the mechanical
characteristics of high temperature materials at
temperatures up to 1500°C, for high temperature static
and dynamic tests of metalloceramic materials and of
components and also certain results of investigations
relating to dissipation of energy in heat resistant
materials at normal and at elevated temperatures.

Card 6/9 The paper of G. S. Brokhin, A. B. Platov and A.I. Baranov

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"Technique of High Temperature Tests Applied by VNIITS" and that of Ye. N. German (VIAM) "On Certain New Methods of Testing High Temperature Metalloceramic Materials" and the paper of V. Z. Tseytlin, M. A. Filatova, A.V. Ryabchenkov and A. I. Maksimov (TsNIITMASH) "Long Duration and Fatigue Strength in Air and in Gaseous Media of a Nickel-Chromium Alloy Used for Transportation (Gas) Turbines" were all devoted to the study of high temperature materials. The results of natural investigations of elements of turbo-machinery were dealt with in papers presented by the personnel of TsKTI imeni Polzunov.

N. N. Kalinovskiy (NII) dealt with the results of investigation of the carrying capacity and the long duration strength of specimens of gas turbine discs of a new design and a complicated configuration under conditions similar to the operating conditions. The author described the features of the heating system and of the damping equipment which ensures the possibility of long duration tests of natural discs by means of racing at a high temperature until disruption occurs and he also considered the deformations of a disc in the case of long

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machinery at elevated temperatures.

duration disruption/^{tests} the character of the disruption
of the projections provided for fixing the discs and
the character is described of the material of the disc
before and after fracture. In his paper "Fatigue
Testing of Turbine Blades and Materials at Normal and
at Elevated Temperatures" I. I. Papchenko (TsKTI) dealt
with the method developed by TsKTI for generating blade
oscillations permitting creation of loads of various
magnitudes and frequencies at the natural oscillation
frequencies, giving some of the results of the investi-
gations.

In her paper "On the Evaluation of the Long Duration
Strength of Components of Gas Turbines Taking Into
Consideration Variable Stresses and Temperatures"
Ye. I. Rusanova (NII) considered the conditions of
disruption and the possibility of reducing the problem
to the usually applied evaluation, assuming a constant
temperature and constant stresses.

The paper of M. Yu. Bal'shin (Institute of Metallurgy,
Ac.Sc. USSR imeni A. A. Baykov) was devoted to
investigating the strength, the mechanism of sintering
and the creep in relation to the thermal properties of

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Scientific Conference on the strength of elements of turbo-machinery at elevated temperatures.

the materials.
V. V. Kuleshov (VVIA imeni N. Ye. Zhukovskiy) described the application of the method of finite differences to calculating the strength and profiling of non-uniformly heated discs which operate in the elastic range, under conditions of creep and under conditions of plastic deformation.

G. Ye. Krumel' and A. G. Prokopenko (LPI and YuZhORGRES) reported on the method of starting large thermal power equipment and V. I. Tseytlin reported "On the Selection of Optimum Tooth Dimensions".

For improving further the methods of calculation of the strength of individual elements of turbo-machinery at elevated temperatures, the members of the conference recommended that theoretical and experimental investigations should be extended on heat exchange in the components of turbines as well as on the stress state of these elements under conditions of non-steady state heat exchange.

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(Note: This is a complete translation).

AVAILABLE: Library of Congress.

BULANOV, V.N.; FRANTSEVICH, I.N.

Some results of studying the rhenium - beryllium system.
Vop.por.met.i prochn.mat. no.6:32-35 '58.
(MIRA 13:4)

(Rhenium-beryllium alloys) (Sintering)

CHEKHOVA, O.A.; FRANTSEVICH, I.N.

Elastic constants of certain metalloceramic magnetically soft
materials. Vop.por.met.i prochn.mat. no.6:36-41 '58.
(MIRA 13:4)
(Iron alloys--Magnetic properties)

LAVRENKO, V.A.; FRANTSEVICH, I.N.

Investigating the kinetics of high temperature oxidation of tungsten in habitual and deformed states. Vop.por.met.1
prochn.mat. no.6:42-52 '58. (MIRA 13:4)
(Tungsten) (Metals at high temperature)

SOV/137-59-4-8385

Translation from: Referativnyy zhurnal, Metallurgiya, 1959, Nr 4, p 150 (USSR)

CORRESP. MBR AS UKSSR

AUTHORS: Frantsevich, I.N., Kalinovich, D.F., Kovenskiy, I.I., Pen'kovskiy, V.V., Smolin, M.D.

TITLE: Electrodifussion of Tungsten in a Ferro-Tungsten Alloy

PERIODICAL: Dopovidі AS UkrRSR, 1958, Nr 7, pp 736 - 739 (Ukrainian; Russian, English résumé)

ABSTRACT: With the use of radioactive W^{185} isotope the authors investigated migration of W atoms in its solid solution in Fe, affected by a constant electric field. The W content in steel was 0.49%. Experiments on electric migration were carried out at 900°, 950°, 1,000°, 1,100° and 1,150°C with holding for 40 to 110 hours. W atoms were migrating under the effect of a constant electric field towards the cathode. The authors calculated the migration speeds, charges of W ions, and migration at all investigated temperatures. At temperatures raised from 900° to 1,000°C the migration speed and the value of migration numbers increased, the charge remained constant. At a further elevation of the temperature all the indicated values decreased and at 1,150°C they were equal to zero.

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INST METALLO CERAMICS & SPECIAL V.O.
ALLOYS, A.S. UKSSR

SOV/129-52-9-4/16

AUTHORS: Frantsevich, I. N. and Teodorovich, O. K.

TITLE: On Certain Properties of Iron-Copper Alloys Obtained by the Method of Impregnation (O nekotorykh svoystvakh zhelezomednykh splavov, poluchayemykh metodom propitki)

PERIODICAL: Metallovedeniye i Obrabotka Metallov, 1958, Nr 9, pp 20-23 + 1 plate (USSR)

ABSTRACT: The possibility of obtaining cermets from two ageing phases is a very rare and favourable factor for producing materials with a great variety of properties on the basis of the binary system. The results of studying the manufacturing technology and the physico-mechanical properties of iron-copper compositions produced by sintering and impregnation have been described by a number of Western authors (Refs 2 - 10). The aim of the work described in this paper was to ensure by means of strengthening of the inter-phase boundaries and selection of an optimum ageing regime the necessary ductility combined with a high strength (90 kg/mm^2) for an iron-copper alloy. According to Elliott (Ref 9) alloys with the highest strength contained about 8% copper. After homogenisation such alloys should be single-phase alloys in the hardened state. The authors assume that even in

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SOV/129-58-9-4/16

On Certain Properties of Iron-Copper Alloys Obtained by the Method of Impregnation

the aged state such a composition may ensure the desired amount of ductility provided that in addition to an iron base phase it contains a more ductile ageing copper base phase. To avoid etching of the boundaries of the impregnated iron phase and loosening boundaries due to the accumulation of vacancies, the authors manufactured the alloy from solutions of copper in iron and iron in copper which were mutually in equilibrium at the temperature of impregnation or sintering. In this way the optimum conditions were created for ageing of the iron base phase and also of the copper base phase. The iron powder contained 98.3% Fe, 0.3% Mn, 0.1% Si, 0.072% C, 0.01% S and an undissolved residue of 0.17% HCl. It was produced by reduction of scale and was subsequently enriched with copper (to contain 8% Cu) in a solution of copper chloride. From this powder specimens were pressed with the desired porosity and subjected to homogenisation annealing in hydrogen at 1050°C for twenty hours. The impregnating copper alloy, containing 5% Fe, was smelted in an atmosphere of hydrogen using copper which contained

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NOV/129-58-9-4/16

On Certain Properties of Iron-Copper Alloys Obtained by the Method of Impregnation

0.05% admixtures and iron powder. The blanks of the specimens were impregnated in a hydrogen atmosphere in annealed alumina at 1120°C for thirty minutes. For investigation (density, micro-structure) specimens without pores were used. The process of dispersion hardening was investigated as follows: individual batches of fifteen specimens were heated to 1000°C in a hydrogen atmosphere and after a holding time of eight hours they were quenched in water. From these, cuts were made for micro-structural and micro-durometric investigations. To avoid the distorting influence of work hardening, the cuts were produced by means of electrolytic polishing. For studying the influence of the copper component on the strength and hardness, the blanks to be impregnated were pressed with porosities of 15, 20, 25, 30, 35 and 50%. After homogenisation annealing, impregnation and machining, the specimens were quenched from 1000°C in water and subjected to ageing at 430°C for three hours. The hardness values of the specimens prior to the mechanical tests are graphed in Fig.2. It can be seen

Card 3/5 that with increasing copper content the hardness and the

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On Certain Properties of Iron-Copper Alloys Obtained by the Method of Impregnation

strength of the pseudo-alloy drop considerably, whilst at the same time the plasticity increases. The graphs, Fig. 3, show the dependence of the micro-hardness of the individual phases on the temperature and the ageing time. It can be seen that considerable differences exist in the progress of the ageing processes in the iron-copper and copper-iron phase components; the hardening curves of the first mentioned phase are typical ones of artificially ageing alloys. Micro-structure photographs of specimens with various copper contents are reproduced in Fig. 4 (plate). Comparison of the data of the metallographic analysis with the mechanical characteristics of the alloys leads to the conclusion that in the case of a copper content of 50% the mechanical characteristics are determined fundamentally by the properties of the copper base phase. For a copper content of 25%, the iron base phase predominates; obviously, the strength characteristics of such an alloy are typical of a single-phase solution of copper and iron. In the case of high temperature annealing, the

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SOV/129-58-9-4/16

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tendency was observed of the copper phase to expand along the grain boundaries of the iron solution; this process is characterised by a drop in strength and an increase in the ductility (Fig.5 and Fig.6 (plate). Thus, in the given case the physical-mechanical properties are determined not only by the state of the individual phases but also by their mutual location. There are 6 figures and 10 references, 9 of which are English, 1 German.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN USSR
(Metal Ceramics and Special Alloys Institute,
Ac.Sc. Ukraine)

1. Copper-iron alloys--Properties
2. Copper-iron alloys--Phase studies
3. Copper-iron alloys--Analysis

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FRANTSEVICH, I.N.; PILYANKEVICH, A.N.

Electron microscope examination of fractures of cermets (micro-
graphic analysis of fractures). Inzh.-fiz.smur. no.10:47-54
0 '58. (MIRA 11:11)

1. Insitut metallokeramiki i spetsial'nykh splavov AN USSR, g.Kiyev.
(Cermets--Metallography) (Electron microscopy)

SOV/24-58-10-21/34

AUTHORS: Mel'nichuk, P. I., Frantsevich, I. N. (Kiev)

TITLE: Hardness of Limited Solubility Nickel-Base Alloys at Room Temperature (O tverdosti splavov na osnove nikelya s ogranichennoy rastvorimost'yu, opredelyayemoy pri komnatnoy temperature)

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, 1958, Nr 10, pp 124-125 (USSR)

ABSTRACT: The increase in hardness of limited solid solubility alloys is due to the difference in atomic diameters of the constituents (Ref.1), change in lattice parameter of the crystal lattice (Ref.2) and increase in inter-atomic bond force (Ref.3). Alloys of the following systems were studied: Ni-Ti, Ni-Al, Ni-W, Ni-Cr. It was found that the modulus of elasticity of Ni-W and Ni-Cr alloys increased and the mean square displacement of atoms decreased with increase in chromium and tungsten content, respectively, which shows that tungsten and chromium increase the inter-atomic bond force in the nickel lattice. Ti and Al lower this bond force in the nickel lattice (see Fig.1). Tungsten, and to a lesser extent,

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SOV/24-58-10-21/34

Hardness of Limited Solubility Nickel-Base Alloys at Room Temperature

Ti, Al and Cr harden the nickel (see Fig.2). The hardness of limited solid solubility alloys increases with increase in alloy element content, irrespective of whether the latter strengthens bond forces in the lattice of the solvent metal (W, Cr), or weakens them (Ti, Al). There is no direct relationship between inter-atomic bond force and hardness. The former is only a measure of the potential (theoretical) strength of the alloy. The actual strength is less than the theoretical. The increase in hardness of the investigated alloys has been explained by Gulyayev (Ref.2). The lattice parameter of nickel increases linearly with increase in W, Ti, Al and Cr. At equal atomic percentages of alloying elements, the hardness will be the higher the greater the lattice parameter. The disturbances of the structural uniformity of the solvent lattice, due to dissolved foreign atoms, act as keys, opposing the spreading of plastic deformation and hence the hardness of the alloy increases. There are 3 figures and 5 Soviet references.

SUBMITTED: November 18, 1957.

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FRANSEVICH, I.N.; TEODOROVICH, O.K.

Cermet iron-copper compositions used for manufacturing machine parts [with summary in English]. Inzh.-fiz.zhur. no.12:32-37 (MIRA 11:12)
' 58.

1. Institut metallokeramiki i spetsial'nykh splavov AN USSR,
g. Kiyev.

(Cermets)

FRANTSEVICH, I.N. [Frantsevych, I.M.]; KALINOVICH, D.F. [Kalynovych, D.F.]
KOVENSKIY, I.I. [Kovens'kyi, I.I.]; PEN'KOVSKIY, Y.V. [Pen'kovs'kyi,
Y.V.]

Migration of components of solid metal solutions in a direct current
field. Part 2. [in Ukrainian with summary in English]. Ukr. fiz. zhur.
Supplement to 3 no.1:64-67 '58. (MIRA 11:6)

1. Institut metalokeramiki i spetsstplaviv AN URSR.
(Ions--Migration and velocity)
(Solutions, Solid--Electric properties)

FRANTSEVICH, I.M. [Frantsevych, I.M.]; KALINOVICH, D.F. [Kalynovych, D.F.];
KOVENSKIY, I.I. [Kovens'kyi, I.I.]; PEN'KOVSKIY, V.V. [Pen'kovs'kyi,
V.V.]

On the migration of solid metal solution components in a direct
current field [In Ukrainian with summary in English]. Ukr.fiz.zhur.
3 no.1:124-133 Ja-F '58. (MIRA 11:4)

1. Institut metalokeramiki spetsial'nikh splaviv AN URSS.
(Heat resistant alloys)
(Electric fields)

FRANTSEVICH, I.M. [Frantsevykh, I.M.]; KALINOVICH, D.F. [Kalynovych, D.F.];
KOVENSKIY, I.I. [Kovens'kyi, I.I.]; PEN'KOVSKIY, V.V. [Pen'kovs'kyi, V.V.]

Migration of the components of solid solutions of metals in the field
of a direct current. Part 3 [with summary in English]. Ukr.fiz.zhur.
3 no.4:552-559 J1-Ag '58. (MIRA 11:12)

1. Institut metallokeramiki i spetsial'nykh splavov AN USSR.
(Diffusion) (Solution, Solid) (Iron)

SOV/126-6-5-23/43

AUTHORS: Frantsevich, I.N., and Mel'nichuk, P.I.

TITLE: Modulus of Elasticity and Hardness of Ageing Cu-Be Alloys
(Modul' uprugosti i tverdost' stareyushchikh splavov med'
- berilliy)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1958, Vol 6,
Nr 5, pp 912 - 918 (USSR)

ABSTRACT: The role of beryllium in copper is one determining the modulus of elasticity for a composition range of quenched Cu-Be alloys having a homogeneous structure and the extent of mean square displacement of atoms in the solid solution lattice. In Figure 1 the change in modulus of elasticity $\sqrt{u_{293}^2}$ and permanent hardness of copper in relation to Be content are shown. From this it can be seen that Be weakens the bond of the copper lattice, thus intensifying the ageing process. In the present paper the results of an investigation of the ageing of Cu-Be alloys are given. Specimens containing 1, 1.5 and 2% Be by weight were quenched after soaking at 820 °C for 2.5 hours in an argon atmosphere. Ageing was carried out in salt baths. In Figure 2 curves for the change in hardness,

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Modulus of Elasticity and Hardness of Ageing Cu-Be Alloys

specific gravity and modulus of elasticity of quenched 1.5%Be alloys on subsequent re-heating at temperatures within the range 150 to 700 °C are shown. Figures 3 and 4 show micro-photographs of aged alloys of this composition. In Figures 5 and 6, the results of an investigation of ageing of 2% Be alloys are given. When the maximum strength is reached, a restoration of the bond strength is observed, even in alloys in which the ageing action of alloy constituents weakens the interatomic bond due to unification of the primary solid solution approaching the bond strength of the pure solvent. It is shown that in 1.5% Be alloys decomposition starts along the grain boundaries and gradually spreads into the grain bodies. At all ageing stages of this alloy the ageing process is associated with heterogenisation of its structure. In a 2% Be alloy a process occurs in the first stages of ageing, embracing the entire body of the metal, in the boundaries of the "one-phase" transformation in which the influence phase of the coherent solution becomes associated with the matrix of the primary solution and its nuclei form in the planes (111), the atomic closeness

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Modulus of Elasticity and Hardness of Ageing Cu-Be Alloys

of which approaches that of nuclei of the new phase as seen two-dimensionally. The role of stress relaxations during shaping of structures of aged alloys is shown by the ageing of 1.5 and 2% Be alloys in the range 300 to 400 °C with short and long soaking times. By analysing modulus of elasticity curves it is proved that the preferential passing into solid solution of an alloy element, exercising an ageing action, corresponds to the descending portion of the hardness curve beyond the maximum. A comparison of the calculated values of the modulus of elasticity with measured ones for a 2% Be alloy shows that at ageing temperatures of 350 to 400 °C and definite soaking times, the decomposition of the α -solid solution under the influence of internal stresses penetrates deeper than can be predicted from the equilibrium diagram. There are 6 figures, 3 tables and 8 Soviet references.

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SOV/126-6-5-23/43
Modulus of Elasticity and Hardness of Ageing Cu-Be Alloys
ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov
AN USSR (Institute of Metal Ceramics and Special
Alloys of the Ac.Sc. Ukrainian SSR)
SUBMITTED: February 4, 1957 (initially)
March 13, 1957 (after revision)

Card 4/4

15.2220

AUTHORS: Pilyankevich, A. N. and Frantsevich, I. N.

TITLE: 4 On the Comparative Characteristics of the Brittleness of
High Temperature Compounds (O sravnitel'nykh pokazatelyakh
khrupkosti tugoplavkikh soedineniy)

PERIODICAL: Fizika metallov i metallovedeniye, Vol 7, Nr 3, pp 470-473
(USSR) 1958

ABSTRACT: Slightly Abridged Translation.

The basic physical (mechanical, thermal and crystallo-chemical) properties of carbides, borides, silicides and nitrides have been studied very little. Hence the heat-resistant compositions had to be found empirically. As a result of many investigations the following were found to be the most promising: compositions based on titanium carbide, silicon carbide, boron carbide, several borides, silicides and, among them, particularly molybdenum bisilicide, carbosilicides and other compounds related to Novotom phases as regards their crystallochemical nature; nitrides (silicon nitride and boron nitride) and finally the refractory oxides

Card 1/4 (Al₂O₃, ZrO₂, BaO and others). The diagram of Fig.1

On the Comparative Characteristics of the Brittleness of High Temperature Compounds

illustrates the relationship between stability and time at 1000°C for a few refractory metallic and metallo-ceramic compositions. The tendency to brittle fracture as well as the insufficient stability of these materials to thermal shock is associated with the fact that their resistance to fracture is not very high and, therefore, they do not resist the action of normal tensile stresses very well. The influence of brittleness on the service properties of highly refractory compositions can be generalized by introducing metallic or non-metallic additions which heterogenize the structure and increase the relaxation capacity of the material, or by adequate construction of the parts for special purposes. However, it is possible to solve the problem regarding the application of highly refractory compositions to machine construction by developing methods for the plastification of the supporting constituent structure. For the development of investigations in this direction it is necessary, first of all, to obtain sufficiently clear and positive indications of the brittleness of the materials studied in their pure phases and phases of variable composition. The present

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SOV/126-7-3-38/44

On the Comparative Characteristics of the Brittleness of High Temperature Compounds

work is concerned with the solution of this problem. For a comparative estimation of the brittleness of various refractory compounds, the authors used an electron microscopic method for the study of the fractures of these bodies, as well as a statistic micro-durometry method. An electron optical fractographic method has been described in detail by Pilyankevich (Ref.2). By this method the authors obtained the fracture structures of polycrystalline specimens of silicon, β -silicon carbide, zirconium carbide, titanium carbide and niobium boride (see Figs.2-5). It can be assumed that those phases in which fracture occurs along perfect cleavage planes (Si and NbB_2) must be characterised by a lowering in resistance to fracture and an increase in brittleness; phases with complex structure of block fractures (β -SiC, ZrC, TiC) must be less brittle. These qualitative phase characteristics find quantitative confirmation in statistic relative brittleness curves. For the plotting of curves (see Fig.6) the authors used a method in which the

Card 3/4 non-fractured prints of the indenter of the microdurometer

4

0001

007/126-7-3-38/44

On the Comparative Characteristics of the Brittleness of High Temperature Compounds

PMT-3, applied to the crystallite surface in the micro-section, were counted for various loads (as a percentage of the total number of prints). The lowest curve characterizes the most brittle material investigated (Si), the highest curve the most plastic. It has been found that the "most plastic" and the most thermal shock-resisting metallo-ceramic refractory materials investigated so far are titanium carbide based compositions.

There are 6 figures and 3 references, of which 1 is Soviet, 1 English and 1 German.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov
AN USSR (Institute of Metallo-ceramics and Special Alloys,
Ac. Sc. Ukrainian SSR)

4

SUBMITTED: July 22, 1957

Card 4/4

FRANTSEVICH, I.M.[Frantskevych, I.M.]

International conference on using radioisotopes. Visnyk AN URSSR
29 no. 6:24-33 Ja '58. (MIRA 11:7)

1. Chlen-korrespondent AN URSSR.
(Radioisotopes--Industrial applications)

AUTHORS: Frantsevich, I. N., Kalinovich, D. F., SOV/20-121-2-23/53
Kovenskiy, I. I., Pen'kovskiy, V. V.

TITLE: The Role of Iron as an Acceptor in an Iron-Carbon Alloy
(Ob aktseptornoy roli zheleza v zhelezo-uglerodistom splave)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol. 121, Nr 2,
pp. 277 - 279 (USSR)

ABSTRACT: The stability of the interatomic binding in the crystal
lattice is essentially important for a number of properties
as e.g. the heat resistance. The stability of the binding
depends on the donor-acceptor interaction of the atoms of the
alloyed components with the atoms of the base metal of an
alloy. From the number of indirect methods of investigating
the donor-acceptor interaction (X-ray structure-, magnetic-,
thermochemical analysis, measurement of the electric resistance
etc.) the most effective method is that of electric transfer
- the migration of the atoms of the alloy component in a
steady electric field. In their investigation the authors
used samples of Fe-C-alloys with 0,6 mm diameter and 60 mm
length, produced from electrolytic iron with 1% C; the central

Card 1/3

The Role of Iron as an Acceptor in an Iron-Carbon Alloy SOV/20-121-2-23/53

parts of the samples were covered electrolytically by radioactive Fe^{59} . The coordinates of the radioactive investigation zones were measured by means of a comparator. The investigations were carried out in the temperature range of from 900 to 1100°C, the samples were exposed to these temperatures for from 12 to 40 hours. The displacement of the boundaries of the activated zones is in the order of some tenths of a mm up to some mm (the displacement of the anode boundary is almost ten times higher than the displacement of the cathode boundary, if $T < 1000^\circ$), the velocity of displacement of the zone boundaries is about some 10^{-6} cm/sec and decreases with increasing T. If $T = 1100^\circ\text{C}$ a migration practically does not take place any longer (see Table 1) There are 1 figure, 1 table, and 15 references, 6 of which are Soviet.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov Akademii nauk
USSR (Institute of Powder Metallurgy and Special Alloys, AS USSR)

Card 2/3

CHEKHOVA, Ol'ga Aleksandrovna [Chekhova, O.O.]; FRANTSEVICH, I.M.,
otv.red.; KISINA, I.V., red.izd-va; MATVIYCHUK, O.O.,
tekhn.red. [Matviichuk, O.O.]

[Magnetically soft metal-ceramic materials] Magnitnom'iaki
metalokeramichni materialy. Kyiv, Vyd-vo Akad.nauk URSS,
1959. 31 p. (MIRA 12:7)

1. Chlen-korrespondent AN USSR (for Frantsevich).
(Cermets--Magnetic properties)

SAMSONOV, G.V., otv.red.; FRANTSEVICH, I.N., red.; FEDORCHENKO, I.M., red.;
PISARENKO, G.S., red.; YKREMENKO, V.N., red.; PADERNO, V.N., red.;
KISINA, I.V., red.izd-va; LISOVETS, A.M., tekhn.red.

[Ceramic metal materials and methods of studying them; technical
data] Metallokeramicheskie materialy i metody ikh issledovaniya;
informatsionnye materialy. Kiev, 1959. 55 p. (MIRA 13:3)

1. Akademiya nauk URSS, Kiev. Institut metallokeramiki i spetsyal'-
nykh splaviv.

(Ceramic metals)

SAMSONOV, Grigoriy Valentinovich; FRANTSEVICH, I.N., otv.red.; LAZEBNIK, K.I.,
red.izd-va; MATVEYCHUK, A.A., tekhn.red.

[Silicides and their use in industry] Silitsidy i ikh ispol'-
zovanie v tekhnike. Kiev, Izd-vo Akad.nauk USSR, 1959. 203 p.

1. Chlen-korrespondent AN USSR (for Frantsevich).
(Silicides)

FRANTSOVICH, I.M.

Sov/3355

PHASE I BOOK EXPLOITATION

18(7) Akademiya nauk SSSR. Institut metallurgii. Nauchnyy sovet po problemam zharnoprochnykh splavov. IV (Studies on Heat-Resistant Alloys, vol. 4). Moscow, Izdat. AN SSSR, 1959. 400 p. Issledovaniya po zharnoprochnym splavam. 2,200 copies printed. Errata slip inserted. Ed. of Publishing House: V. A. Kiselev; Tech. Ed.: A. P. Guseva; Editorial Board: I. P. Bardin, Academician; O. V. Kiselev, Academician; V. V. Agayev, Corresponding Member, USSR Academy of Sciences; A. A. Odintsov, I. M. Pavlov, and I. P. Zudin, Candidate of Technical Sciences.

PURPOSE: This book is intended for metallurgists concerned with the structural metallurgy of alloys.

CONTENTS: This is a collection of specialized studies of various problems in structural metallurgy of heat-resistant alloys. Some are concerned with theoretical principles, others with descriptions of new equipment and methods, others with properties of specific materials. Various phenomena occurring under specified conditions are studied and reported on. For details, see the Soviet Contents. The articles are accompanied by a number of references, both Soviet and non-Soviet.

Pines, B. Ya., and A. P. Sirenko. Investigation of Diffusion-Creep in Ternary Alloys	301
Bal'ashin, N. Yu. Some Problems in the Theory of Sintering and Creep	311
Origor'yeva, V. V., and V. M. Klisenko. Properties of Chromium Carbides and of Cermetes Based on Them	317
Svet, D. Ya. Radiant Emissivity of Metals	323
Frantsuzovich, I. M., and V. A. Lavrenko. High Temperature Oxidation of Titanium, Molybdenum, and Niobium in the Recrystallized and Work-Hardened States	329
Arkharev, V. L., and B. S. Boriansky. Effect of Alloying Elements on the Scale Resistance of Alloys and on the Strength in Oxide-Phase Alloys in Scale. Effect of Strain and the Combined Effect of Chrome and Nickel on the Bond Strength in Hematite	330

Card 10/12

SOV/180 59-1-13/29

AUTHORS: Kalinovich D.F., Kovenskiy I.I., Smolin M.D. and
Frantsevich I.N. (Kiyev)

TITLE: Investigation of the Migration of the Components of an
Iron-Tungsten Alloy in a Constant Electric Field
(Issledovaniye migratsii komponentov splava zhelezo-
vol'fram v postoyannom elektricheskom pole)

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh
nauk, Metallurgiya i toplivo, 1959, Nr 1, pp 71-74 (USSR)

ABSTRACT: The authors point out that one of the best methods for
studying the donor-acceptor electron interaction in alloys
is to study the migration of the components under the
action of an electric field. In the published data for
solid metal alloys, however, only one component is
considered and the possibility of donor-acceptor inter-
action is not examined. The authors describe their own
work on the transfer of the components of a solid solution
of 5 wt. % tungsten in iron. For studying the diffusion
of tungsten W185 was introduced by diffusion into the
central part of an electrolytic-iron wire 60 mm long and
0.6 mm in diameter. The activity was determined along
the test piece before and after its heating by the

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SOV/180-59-1-13/29

Investigation of the Migration of the Components of an Iron-Tungsten Alloy in a Constant Electric Field

passage of a direct current. For studying the mobility of iron, the normal isotope of tungsten was introduced by diffusion into a similar specimen (diameter 0.65 mm) over its whole length. Fe⁵⁹ was then deposited electrolytically on the central zone of the specimens and the distribution of this radioactive isotope over the cross-section was secured by annealing. After heating by the passage of a direct current the wire was cut into sections whose activities were determined. The heating temperatures were 900, 950, 1000, 1050, 1100 and 1150°C \pm 5-7°C, the times being 40-110 hours for the tungsten mobility and 10-40 for the iron mobility experiments. Fig 1 shows typical distributions of activity along the length of the specimen for Fe - W¹⁸⁵ (950°C, 40 hours); Fig 2 the distributions for Fe - W - Fe⁵⁹. The distribution obtained when an alternating current was used is shown in Fig 3. The authors determine the transfer numbers of tungsten and iron for the various temperatures on the basis of equations previously deduced (Ref 1) and published data on diffusion coefficients (Ref 2).

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SOV/180-59-1-13/29

Investigation of the Migration of the Components of an Iron-Tungsten Alloy in a Constant Electric Field

They conclude that it has been shown that at 900-1100°C the valency electrons contributed by tungsten atoms go to fill the vacant 3d-levels of iron atoms, producing a donor-acceptor interaction.

Card 3/3

There are 3 figures, 1 table and 3 Soviet references.

SUBMITTED: June 4, 1958

18(4)

SOV/170-59-4-7/20

AUTHORS: Frantsevich, I.N., Kalinovich, D.F., Kovenskiy, I.I., Smolin, M.D.

TITLE: On Electrical Transfer of Tungsten in Nickel-Tungsten Alloys (Ob elektroprenose vol'frama v nikel'evol'framovom splave)

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1959, Nr 4, pp 47-51 (USSR)

ABSTRACT: The present paper describes the results of investigations into electrical transfer of tungsten in solid solution in nickel. Experiments were performed with pieces of nickel wire 0.61 mm in diameter and 60 mm long. Tungsten marked with radioactive W^{185} isotope was introduced into the central portions of the specimens by diffusion. The tungsten content in these portions amounted to 0.54 per cent by weight. The tungsten transfer through a constant electric field was studied at temperatures of 850, 900, 950, 1,000, 1,050 and 1,100°C. It was shown that tungsten atoms migrate towards the cathode, i.e., in the alloy under investigation they are donors of electrons. Charges on tungsten ions and the numbers of electrons transferred are calculated by formulae derived by the authors. It turned out that the effect of electrical transfer increases with an increase in temperature from 850 to 950°C, and then begins to fall reaching

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SOV/170-59-4-7/20

On Electrical Transfer of Tungsten in Nickel-Tungsten Alloys

zero at 1,100°C. Electron transfer numbers also conform to this pattern. The charge on ions remains constant in the temperature range from 850 to 950°C, and then decreases reaching zero at 1,100°C.

There are 2 graphs, 2 tables and 9 references, 5 of which are Soviet, 2 English, 1 Indian and 1 unidentified.

ASSOCIATION: Institut metallokeramiki i spetsstavlavov AN USSR (Institute of Metal Ceramics and Special Alloys of the AS UkrSSR), Kiyev.

Card 2/2

МЛ'НИЧУК, П.И.; ФЕД'СЕВИЧ, Л.П.

Investigating the modulus of elasticity of alloys. Vop. per.
mat. i problem. mat. no. 7:32-38 '59. (MIA 14:1)
(Alloys--Testing) (Elasticity)

FRANTSEVICH, I.N.; LADOMOSHIKIN, I.D.

Obtaining a reducing atmosphere from natural gas for ceramic
metal processes. Vop. por. met. i prochn. mat. no. 7:120-124
'59. (NIA 14:2)

(Ceramic metals) (Reducing agents)

06567

18(3)

SOV/170-59-9-8/18

AUTHORS: Frantsevich, I.N., Kalinovich, D.F., Kovenskiy, I.I., Smolin, M.D.

TITLE: On the Donor-Acceptor Interaction of Components in a Binary Iron-Chromium Alloy

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1959, Nr 9, pp 62-68 (US3R)

ABSTRACT: Electric transfer of components in solid metallic solutions furnishes important information for the development of the electronic theory of alloys. The purpose of the present investigation was to study the behavior of the components of the solid solution of chromium in iron in a constant electric field. Radioactive isotopes Cr^{51} and Fe^{59} were employed for marking atoms migrating in the process of electric transfer. It was established by experiments that the chrome-plated zone in all samples was shifted towards the cathode; hence it is concluded that chromium in its solid solution with iron is a donor of electrons. The study of electric transfer was carried out at temperatures of 1,000, 1,050, 1,100 and 1,150°C and at various durations. It turned out that the electric transfer of chromium ions increases with an increase in temperature and duration of experiments. This relationship is shown in Figure 2. The study of the electric transfer of iron ions was carried

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SOV/170-59-9-8/18

On the Donor-Acceptor Interaction of Components in a Binary Iron-Chromium Alloy

out at temperatures from 900 to 1,200°C and various durations. The rate of migration of iron ions grows with an increase of temperature until 1,050°C and then falls down to 1,200°C. At a fixed temperature, the effect of electric transfer increases linearly with the duration of experiments. This is shown in Figure 4. The experimental data obtained made it possible to determine the charges and numbers of transferred ions of chromium and iron at various temperatures. These data are presented in Table 1. Thus the existence of a donor-acceptor interaction in the iron-chromium alloy has been established; it diminishes with an increase of temperature above 1,050°C. This finding agrees with a conclusion by P.L. Gruzin [Ref 17] that chromium strengthens interatomic interaction in the iron lattice at temperatures below 1,100°C.

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SOV/170-59-9-8/18

On the Donor-Acceptor Interaction of Components in a Binary Iron-Chromium Alloy

There are: 4 graphs, 1 table and 17 references, 8 of which are Soviet, 6 German, 1 French, 1 Indian and 1 unidentified.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN USSR (Institute of Ceramics and Special Alloys of the AS UkrSSR), Kiyev.

Card 3/3

FRANTSEVICH, I.N.; KALINOVICH, D.F.; KOVENSKIY, I.I.; SMOLIN, M.D.

Some quantitative relationships of donor-acceptor interactions in
alloys. Fiz.tver.tela 1 no.1:62-66 Ja '59. (MIRA 12:4)
(Alloys) (Electrons)

67689

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SOV/126-8-4-11/22

AUTHORS: Frantsevich, I.N., Kalinovich, D.F., and Kovenskiy, I.I.

TITLE: The State of Carbon and Iron in Steel ✓

PERIODICAL: Fizika metallov i metallovedeniye, 1959, Vol 8, Nr 4,
pp 574-578 (USSR)

ABSTRACT: The authors point out that much of the work (Refs 1-8) on the ionic nature of carbon in alpha and gamma iron had the disadvantage that the migration of carbon was found indirectly, and that some methodological deficiencies also occurred. This and other (Ref 9) work indicates that in austenite there are positive carbon ions, considered by some authors (Refs 8, 9) to have a charge of 3 to 4 units. Hume-Rothery (V. Yum-Rozeri) (Ref 10), however, has a different theory, which the authors' present work has contradicted. This was carried out using radioactive isotopes C^{14} and Fe^{59} , one of which was introduced in the middle part of the wire specimen. After prolonged high-temperature treating by the passage of a direct current the shift of the radioactive zone was determined. A typical activity vs distance curve for 8 hours at 1100 °C is shown in Fig 1. Experiments were carried out at 950, 1000, 1050, 1100 ✓

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1/3

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SOV/126-8-4-11/22

The State of Carbon and Iron in Steel

and 1150 °C, the specimens being pure iron. The effects of ordinary diffusion were allowed for by parallel experiments with alternating current. All tests showed that all the carbon in the austenite participates in the movement: contrary to Hume-Rothery's views no negative carbon ions are present. This is confirmed by microstructures of the specimen cross sections, showing that the anodic zone is completely decarburized by passing direct current. For studying migration of iron the radioactive iron isotope was introduced into a wire specimen carburized uniformly over its whole length with stable carbon. Experiments were carried out at 900, 950, 1000, 1050 and 1100 °C, a typical activity vs distance curve (30 hours at 950 °C) being shown in Fig 3. Calculations using an equation previously published by two of the authors (Ref 13) show that the carbon atoms in the austenite lattice participating in the migration have only 1.4 electrons each over the whole temperature range studied. The iron atoms at 900 °C accept 4 electrons each, 3.5 at 950 °C, 3.0 at 1000, 2.2 at 1050, and none at 1150 °C. The authors discuss the donor and 4

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The State of Carbon and Iron in Steel SOV/126-8-4-11/22

acceptor roles of the atoms of the added element in a metallic solid solution, coming to conclusion in harmony with modern ideas on the electronic structure of such solutions (Ref 15).

There are 3 figures and 15 references, 10 of which are Soviet, 4 English and 1 is German.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov
AN SSSR

Card 3/3 (Institute of Ceramics and Special Alloys, Ac.Sc.
USSR)

SUBMITTED: August 25, 1958

FRANTSEVICH, I.M. [Frantsevykh, I.M.]

Powder metallurgy. Nauka i zhyttia 9 no.3:22-24 Mr '59.

(MIRA 12:4)

1. Direktor Instituta metallokeramiki i spetsial'nykh splavov
AN USSR. Chlen-korrespondent AN USSR.

(Powder metallurgy)

FRANTSEVICH, I.M., [Frantsevykh, I.M.]; LOMAZOV, D.B.; ROGOZA, F.A.[Rohoza, F.A.];

Protection of city gas pipelines against corrosion. Visnyk AN USSR
30 no.7:17-20 J1 '59. (MIRA 12:10)

1.Chlen-korrespondent AN USSR (for Frantsevich).
(Gas, Natural--Pipelines)
(Corrosion and anticorrosives)

S/124/62/000/007/027/027
D234/D308

AUTHORS: Mel'nichuk, P. I. and Frantsevich, I. N.

TITLE: Investigation of the modulus of elasticity of alloys

PERIODICAL: Referativnyy zhurnal, Mekhanika, no. 7, 1962, 66, abstract 7V504 (V sb. Vopr. poroshkovoy metallurgii i prochnosti materialov. no. 7, Kiev, AN UkrSSR, 1959, 33-38)

TEXT: The alloy Ni-W was investigated; the modulus E was determined from the frequency of longitudinal vibrations. With increasing W content E increases and the mean square displacements of atoms from their sites in the lattice becomes less pronounced. This indicates an increase in the strength of interatomic bonds. [Abstracter's note: Complete translation.] ✓

Card 1/1

"APPROVED FOR RELEASE: 06/13/2000

CIA-RDP86-00513R000413610013-2

1960 -

APPROVED FOR RELEASE: 06/13/2000

CIA-RDP86-00513R000413610013-2"

PLATE 1 BOX EXPLOITATION **507/1547**

Адрес: г. Минск, ул. Мухоморова, 1. Контакт: зав. кафедрой психологии
Беларусь, 220004

Trudy, Vys. no. 5 (Transactions of the Academy of Sciences, Ukrainian SSR, Institute of Metal Chemistry and Special Alloys, Section on Heat Resistant Materials, No. 5) Kiev, Izdat. Ak. Ukrainyoi Nauk, 1976. 63 p. 2,000 copies printed.

Ed. of Publishing House: I.V. Kislina; Tech. Ed.: A.A. Matveychuk; Editorial Board: G.Y. Gerasov (Resp. Ed.), I.N. Prutsevich, T.Y. Orlovskaya, A.I. Men'shikov, and M.I. Kopylovsky.

REMARKS. The book is intended for engineers, scientists, architects and students specializing in refinery metals and their compounds, process metallurgy, electronics, machine building and physical metallurgy in schools of higher technical education.

COVERAGE: This collection of papers, originally preserved at the Seminar on Marxist Materials in Kiev on June 13-June 17, 1992,

[illegible]

Discussion

2

Prutsevich, I.N., and A.N. Plyushevich. Comparative Investigations of Different Groups of Questions and Answers

4

Alpharvor, V. L. and V. N. Knyaz. Joint Diffusion of Two Enzymes
in Hard Material

4

Discussion

X:

Research, Inc., and R.N. Emery, Inc. Structure and Properties
of Bodies of Low-Earth Orbits Questions and Answers

4.

Abstracts Vol. 1 and 2, Abstracts. Provision Determination of
 Lattice Intervals of Poron Carbons of B₂C₂F₂-B₂C₂F₂ Compositions
 According to Neutron-Scattering Data Obtained in the Region of Large
 Scattering Angles (9-90°)
 Questions and Answers
 Discussions

52

AVP00000000: Library of Congress

22-18-60

YEREMENKO, Valentin Nikiforovich; FRANTSEVICH, I.N., otv.red.; KISINA,
I.V., red.izd-va; KADASHVICH, O.A., tekhn.red.

[Titanium and its alloys] Titan i ego splavy. Izd.2., ispr.
i dop. Kiev, Izd-vo Akad.nauk USSR, 1960. 499 p.

(MIRA 13:5)

1. Chlen-korrespondent AN USSR (for Frantsevich).
(Titanium)

SAMSONOV, Grigoriy Valentinovich, prof., doktor tekhn.nauk; MARKOVSKIY, Lev Yakovlevich, kand.khim.nauk; ZHIGACH, Aleksey Fomich, doktor khim.nauk; VALYASHKO, Mikhail Georgiyevich, doktor khim.nauk. Prinsipal uchastiye SHTRIKHMAN, R.A. FRANTSEVICH, I.N., otv.red.; POKROVSKAYA, Z.S., red.izd-va; SKLYAROVA, V.Ye., tekhn.red.

[Boron, its compounds and alloys] Bor, ego soedineniia i splavy. Pod obshchei red. G.V.Samsonova. Kiev, Izd-vo Akad.nauk USSR, 1960. 589 p. (MIRA 14:3)

1. Chlen-korrespondent AN USSR (for Frantsevich). (BORON)

28225

S/194/61/000/005/069/078

D201/D303

9.2/40 (1001, 1150, 1161)

AUTHORS: Frantsevich, I.N., Teodorovich, O.K., and Gordiyenko, G.N.

TITLE: The use of palladium as a contact material

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika, no. 5, 1961, 57, abstract 5 I386 (V sb. Elektr. kontakty, M.-L., Gosenergoizdat, 1960, 356-364)

TEXT: Alloys, on the basis of silver and palladium with and without small additions of nickel, have been obtained by compressing semi-finished material from highly dispersive powder and its subsequent annealing at 850°C. The subsequent multiple processing of the half-product (final compression, drawing into tape or bars, drawing into wire with intermittent annealing at 850°C) makes it possible to obtain non-porous alloys with anisotropic properties. Certain properties of alloys are given in the table. The alloy APdNS-70 shows considerable advantages over other alloys. From the

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The use of palladium...

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S/194/61/000/005/069/078
D201/D303

point of view of transient resistance it is as good as gold and has a life time and stability exceeding those of all other types. Experimental comparison of contacts made of OK-15 and of ANS-70 has shown that in experimental conditions contacts from the silver-nickel alloy (ANS-70) have the better properties. 2 references.

Legend to table: 1) Trade mark of the alloy; 2) APdS-NO; 3) APdNS-70; 4) ANS-70; 5) Chemical composition; 6) S.g. g/cm³; 7) Vickers hardness; 8) Specific electrical conductivity, % of that of copper.

Марка сплава (1)	Химический состав			Плотность г/см ³ (6)	Твердость по Виккерсу (7)	Уд. электр. проводимость, % к мед. (8)
	Ag	Pd	Ni			
АПдС-НО (2)	65-70	35-30	—	11-12	20-25	10-11
АПдНС-70 (3)	65-70	30-25	5-6	10-11	30-35	12-16
АНС-70 (4)	65-70	—	35-30	—	—	—

[Abstracter's note: Complete translation]

Card 2/2

✓

FRANTSEVICH, I.N. [~~Frantsevich, I.M.~~]; PECHENTKOVSKIY, Ye.L.
[~~Pechentkovskiy, Ye.L.~~]

Use of aluminum-zinc-calcium protectors against the corrosion
of marine vessels. Dop.AN URSR no.1:36-39 '60.

(MIRA 13:6)

1. Institut metallokeramiki i spetsplavov AN USSR. 2. Chlen-
korrespondent AN USSR (for Frantsevich).
(Ships, Iron and steel--Corrosion)
(Aluminum-zinc-calcium alloys)

FRANTSEVICH, I.M.

S/021/60/000/003/005/010
A232/A029

AUTHORS: Frantsevykh, I.M., Corresponding Member of the Academy of Sciences
UkrSSR; Pilyankevych, O.M.

TITLE: On the Relaxation Ability of Refractory Compounds

PERIODICAL: ^{no} Dopovid1 Akademiyi nauk Ukrayins'koyi RSR, 1960, No 3, pp. 339 - 341

TEXT: The report contains results of investigations which are a continuation of the author's study as to the cracking ability of imprints made by a diamond pyramide of a micro-durometer's indenter depending in certain refractory compounds of the carbide, boride, nitride and silicide type (Refs. 5 and 6) on the time. These investigations were started in order to make the methods of studying the micro-brittleness more precise, as well as to compare (according to these methods) the relaxation phenomena in micro-volumes in the refractory compounds investigated, i.e., "the micro-relaxations". The actual time of the action of the load remained unknown, but was proportional to the time of lowering the pyramid, which the authors were able to measure. In consequence of this, the curves obtained can be compared only with one another. According to the results obtained, the following conclusions were drawn: 1) The formation of flaws under

Card 1/2

On the Relaxation Ability of Refractory Compounds

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A232/A029

the indenter of the micro-durometer for refractory compounds is a feature being sensitive to time. 2) The character of the time dependence is substantially unequal for different classes of compounds, but remains equal for the compounds of one class. The shape of the curves depicts the structural characteristics of the compounds. The different angular coefficients show the varying relaxation ability as to the inner stresses. 3) When rating the strength of the inter-atomic bond in the refractory compounds by means of a mean-square displacement of atoms in the crystalline lattice, it was determined that for carbides and certain borides this value changes within the limits of 0.070 - 0.100 Å, for silicides from 0.100 to 0.120 Å, and for nitrides more than 0.120 Å. Based on this fact, it can be said that certain compounds of the type mentioned possess the ability of relaxing the inner stresses in micro-volumes at room temperatures, and that this ability is determined by the class of the compound, its structure and the strength of the inter-atomic bond. There are: 1 figure and 6 references. 4 Soviet, 1 German and 1 French. ✓

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